Mobile Treatment Technologies

- ✓ Mobile treatment technologies can offer alternative, innovative, and immediate approaches to disposing of animal carcasses on-site, particularly in response to emergency situations. There are several types:
- ✓ Incineration
  - ❑ Air-curtain incineration - blowing high velocity air across and down at an optimum angle into a firebox pit creating, an air curtain on top and a rotational turbulence within the firebox
  - ❑ Gasification - the waste mass is destroyed in multiple chambers including a primary (gasification) chamber followed by a secondary (combustion) chamber
- ✓ Rendering - the process of converting animal carcasses into carcass meal (protein-based solids), melted fat or tallow, and water
- ✓ Alkaline hydrolysis - involves processing carcasses at high temperature, high pressure, and high pH to convert the proteins, nucleic acids, and lipids of the tissues to a sterile aqueous solution and solid by-products
- ✓ Microwave sterilization - uses the direct application of multiple, high-energy microwave generators to treat the disposal waste

Advantages

- ✓ Easy to implement due to portability of units
- ✓ Inactivates pathogens
- ✓ Reduces the risk of disease spread due to limited movement and limited handling of infected material
- ✓ Environmentally favorable
- ✓ Self-contained units are generally acceptable to the public

Mobile Treatment Technologies (cont.)

Disadvantages

- ✓ Availability of resources and equipment may be limited
- ✓ Accessibility to equipment may be impeded depending on vendor proximity to the on-site location
- ✓ May need specially skilled operators who can keep equipment running and who are trained in biosafety and biosecurity
- ✓ Level, paved areas may be needed to set up equipment and stage materials
- ✓ Availability and/or sources of spare parts for back-up equipment may be limited
- ✓ Extensive utilities may be required, such as fuel and electric for operations and support equipment
- ✓ Some methods may be limited by the volume of carcasses they can accommodate
- ✓ Some technologies may require preprocessing of carcasses

Disposal and Disinfection of Equipment

- ✓ Remove and place all disposable equipment in designated disposal containers. Disposable PPE should be removed without touching contaminated outer surfaces. Remove gloves last. Pull them inside out and dispose in proper containers.
- ✓ Clean and disinfect reusable equipment with authorized cleaning and disinfecting agents
  - ❑ Cleaning is the physical removal of organic material such as manure, blood, feed, and carcasses; this is a critical step in the decontamination process because organic materials must be removed before the disinfection process begins
  - ❑ Disinfection is the killing of disease agents by direct exposure to chemical or physical agents

Procedures for On-site Burial and Treatment of AI-Infected Poultry Carcasses

PPE Requirements

- ✓ Coveralls - must either be disposable or suitable for disinfection
- ✓ Respirators - N-95 or higher protection disposable particulate respirator
- ✓ Boots or shoe covers - rugged impermeable boots that can be disinfected or discarded
- ✓ Gloves - should be capable of disinfection or disposal
- ✓ Eye protection - should include non-vented eye goggles or indirectly vented eye goggles with anti-fog coating
- ✓ Head protection - includes hard hat and disposable head cover

Personal Hygiene

- ✓ Any clothing worn in the poultry house cannot be worn home
- ✓ Avoid facial contact
- ✓ Leave gloves on while removing other protective clothing; remove gloves last
- ✓ Immediately enter the decontamination trailer
- ✓ Remove shoes and clothing
- ✓ Shower with warm water and soap
- ✓ Put on clean clothes and shoes

Effective Disposal of Carcasses

- ✓ If possible, it is preferable to dispose of infected carcasses on-site to avoid the potential for spreading the disease; a number of on-site treatment and/or disposal methods can be used including, but not limited to, the following:
  - ❑ On-site burial
  - ❑ Open air burning
  - ❑ Mobile treatment technologies
    - ➢ Incineration
      - ▪ Air curtain
      - ▪ Gasifier
    - ➢ Rendering
    - ➢ Alkaline hydrolysis
    - ➢ Microwave
- ✓ Dry cleaning - advantages
  - ❑ Allows thorough removal of organic debris
  - ❑ Aids in efficiency of disinfectants
  - ❑ Currently recommended by USDA APHIS HPAI Plan
  - ❑ Dust can be controlled by first spraying a disinfectant or water/disinfectant solution

On-site Burial

- ✓ Several burial methods may be used to dispose of carcasses:
  - ❑ Unlined trenches or burial pits - involves excavating a trough or pit into the earth, placing carcasses in the excavation, and covering the carcasses with excavated material (backfill)
  - ❑ Landfilling - uses engineered structures built into or on top of the ground in order to isolate waste from the environment
  - ❑ Lined burial sites - refers to excavations which have been lined with an impermeable material and incorporate systems and controls to collect, treat, and/or dispose of leachate and landfill gas

Trench Burial

- ✓ Trench burial is an established, relatively convenient and economical procedure, and requires little expertise to perform, but it does not inactivate all pathogenic agents, and care must be taken to slope the sides of the trench or shore them up to avoid cave-ins. To create a trench burial site you will need:
  - ❑ An area of land large enough to accommodate the mortalities
  - ❑ Adequately trained personnel
- ✓ There are four basic steps in trench burial:
  - ❑ Preprocess (if required) - 'vent' carcasses
  - ❑ Excavate a trough or pit large enough to accommodate carcasses
  - ❑ Place the carcasses in the trench
  - ❑ Cover the trench by mounding the excavated material over the mortalities
- ✓ Advantages:
  - ❑ Limits the spread of disease by minimizing infectious material movement and handling
  - ❑ Relatively quick and easy, requiring few resources to implement
  - ❑ Can accommodate a large number of carcasses
  - ❑ Equipment is generally widely available
- ✓ Disadvantages
  - ❑ May be limited by regulatory constraints or exclusions, lack of sites with suitable geological and/or hydrological properties, and wet or frozen ground
  - ❑ Significant potential to contaminate groundwater
  - ❑ Site may persist for many years or decades because of limited aeration
  - ❑ Disease agents can persist in the environment
  - ❑ May negatively impact land value or options for future land use
  - ❑ Long-term impacts remain unknown

Open Air Burning

- ✓ Open-air burning involves combustion of waste at high temperatures, converting the waste into heat, gaseous emissions, and ash
- ✓ The gaseous emissions are vented directly into the atmosphere in the human breathing zone without passing through a stack or chimney
- ✓ Open-air burning includes burning carcasses in open fields, and on combustible open heaps, or pyres
- ✓ On-farm preprocessing may be required prior to open-air burning, which could include the grinding of carcasses which can be transported in sealed containers, or fermentation or freezing
- ✓ Open-air burning operations are strictly regulated--a permit is usually required to perform open-air burning, if it is allowed at all
- ✓ Advantages
  - ❑ Combines sterilization and carcass destruction into one operation
  - ❑ Can be relatively inexpensive to construct
  - ❑ Can be used anywhere a permit can be obtained and there is sufficient distance from other combustible materials
  - ❑ No specialized equipment or personnel are needed
- ✓ Disadvantages
  - ❑ Can be inefficient and time-consuming
  - ❑ Can be difficult to accomplish because of the high water content of carcasses
  - ❑ May cause significant air emissions
  - ❑ Dependent on favorable weather conditions
  - ❑ Can spread pathogens by dispersing partially-combusted particles into the air
  - ❑ Labor and fuel intensive
  - ❑ Can generate significant public opposition which may make obtaining a permit difficult